Village of Weston:

Snow and Ice Control Strategy

January 2014

OVERVIEW

This packet of information contains highlights of the Village of Weston's snow and ice control strategy. It is our hope that we have proactively provided you with answers to questions you might have about responding to snow/ice events and related issues. The Department of Public Works is currently formalizing a comprehensive written policy to incorporate the items discussed in this packet and more explicitly describe the goals of responding to snow and ice events. Please be aware that the Department holds safety for the traveling public as the primary goal in responding to winter precipitation. However, also understand that maintaining safe travel does not necessarily correspond to bare pavement on all Village streets. Therefore, drivers must be prudent in observing weather and street conditions when traveling in the Village during the winter months. The Village's snow and ice control strategy must balance the need for safety with the reality of limited resources and the impracticality of maintaining ideal road conditions during the winter months. The Department of Public Works is continuously reviewing its snow and ice control response to make improvements. We invite your input as to your perspectives on our snow and ice control practices. Contact us however you prefer, but realize that we will not/cannot respond to anonymous correspondence. Thank you in advance and we wish you safe travels through the winter.

Keith Donner, P.E.
Director of Public Works & Utilities

Michael Wodalski
Deputy Director of Public Works

Doug Behnke
Fleet Manager

Tony Skrzypchak
Street Operations Supervisor

Richard Wanta
Street Operations Supervisor

Snow and Ice Event Responsibility

Village Public Works Operations Staff plows roads for the Village and Town of Weston. This includes:

- 292 Lane Miles between the Village and Town
  - (~50 lane miles per truck)
- 101 Cul-De-Sacs in the Village and Town
- 7 Well/Treatment Facilities for the Water Utility
- 14 lift stations for the Sanitary Utility
- Municipal Center and Public Safety Building
- 6 Parks

SNOW & ICE CONTROL PROCESS

Snow and Ice Event Response

- The Department of Public Works evaluates local conditions.
  - Weather forecasts and radar are monitored
  - Notification of local conditions is relayed to the Department of Public Works by the Everest Metropolitan Police Department during non-regular working hours.

The Conditions Necessary to Call out the Plows

- If streets become….
  - "White" (i.e., snow covered)
  - Slippery

What Gets Done

- The Department of Public Works makes a judgment as to:
  - Whether to respond
  - When to respond
  - What level of effort is necessary.

What Gets Done

All winter precipitation events are different. Factors in determining what needs to be done include:

- Type and amount of precipitation – current and forecast*
- Air temperature – current and forecast
- Pavement temperature
- Humidity
- Wind
- Time of day

**For ease of explanation the discussion of response will focus on snowfall. Obviously other forms of precipitation also require response based on experience and judgment.*

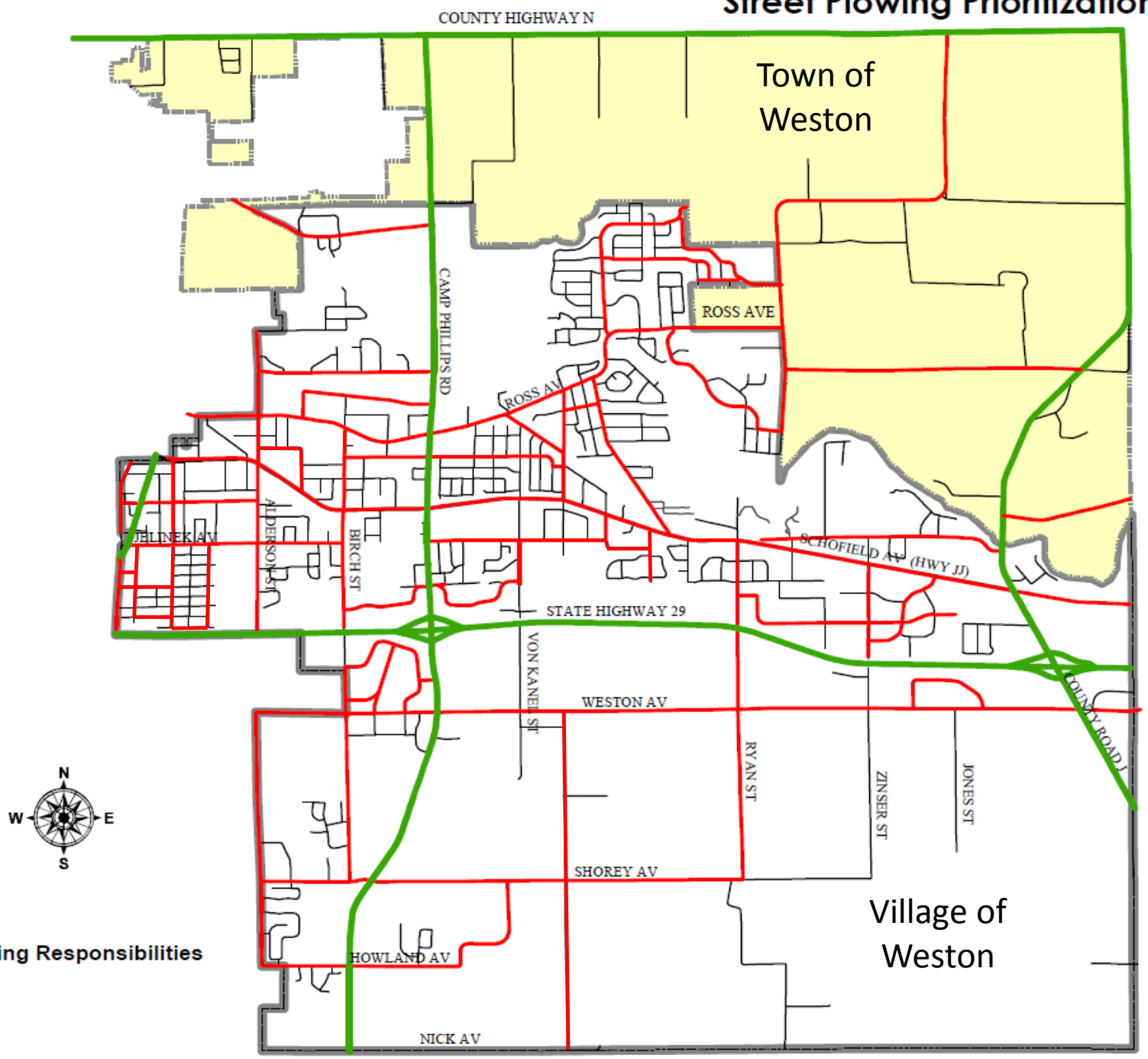
3 Levels of Response

- Level 1 – Any event up to 1” of snow that only requires that major thoroughfares be plowed/salted/sanded.

- Level 2 – An event of between 1” and 3” of snow that requires plowing/salting/sanding on all streets. Cul-de-sacs and sidewalks are not cleared for a level 2 event unless it is during non-overtime work periods and snow has stopped falling.

- Level 3 – An event of 3” or more of snow that requires plowing/salting/sanding on all streets.

Street Plowing Prioritization



Legend

Thoroughfares and Plowing Responsibilities

- Village of Weston
- Marathon County

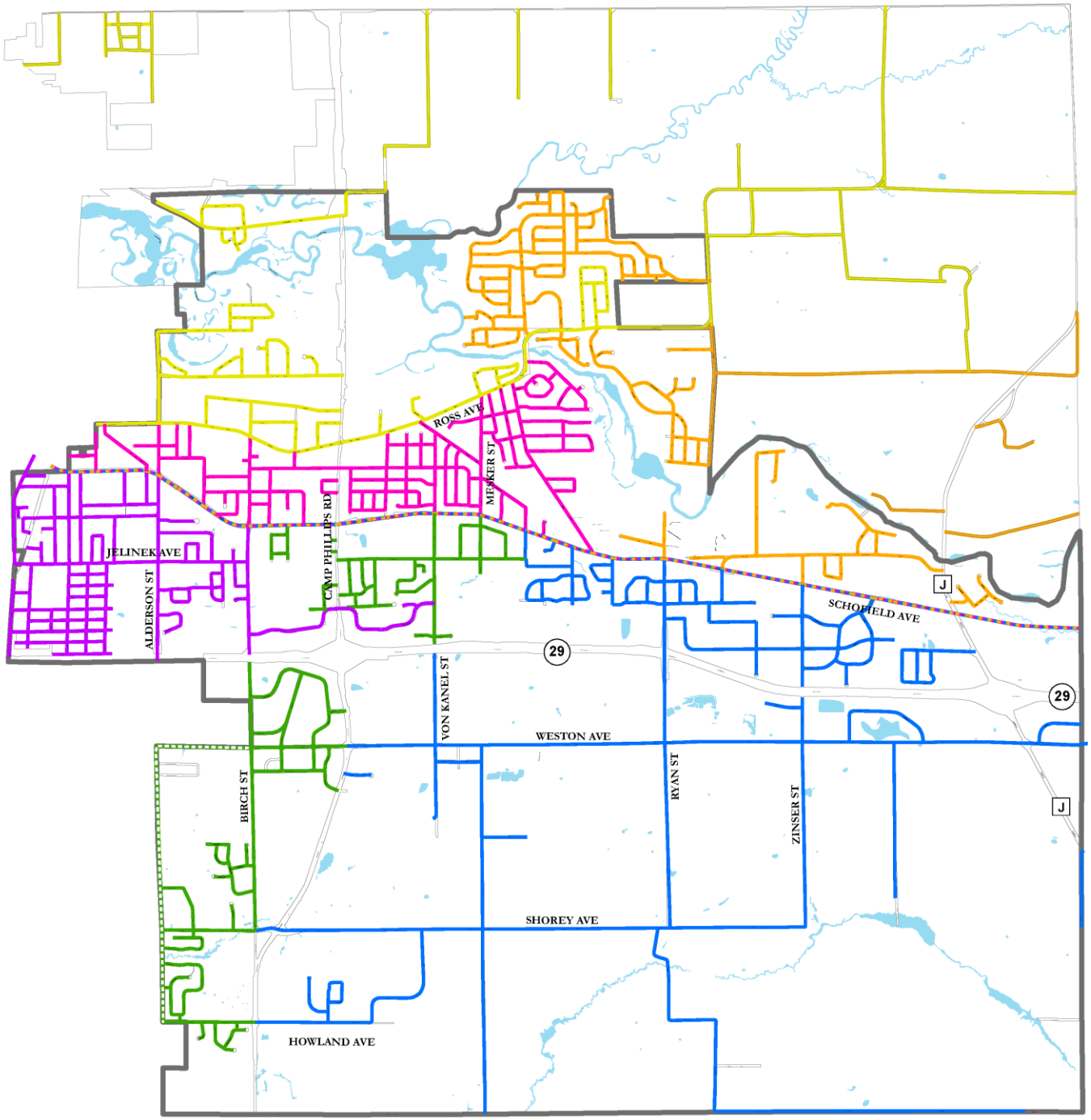
Snow Plow Routes

- For Level 2 and Level 3 event response snow plow routes are addressed in 2 components.
  - The main thoroughfares that would be cleared in a Level 1 response (also referred to as the “salt route”) are cleared first.
  - Once the “salt route” is cleared the staff begins to work on the neighborhood streets on the routes.

Snow Plow Routing

- Each of the 6 single-axle plow trucks is assigned a plowing route in the Village/Town. These trucks are equipped with a front and side(wing) plow, a dump box for hauling salt/sand and a spreader to apply the salt and sand.
- Routes are comprised of main thoroughfares and neighborhood streets. The main thoroughfares are typically referred to as the “salt route” and cleared first.
- Once the “salt route” is cleared the crew begins to work on the neighborhood streets on their route.

2013 Snow Plowing Routes



Legend

Weston Snow Plow Routes

- Truck 9 Plow Route
- Truck 10 Plow Route
- Truck 17 Plow Route
- Trucks 17, 29, 69 Plow Route (Schofield Ave)
- Truck 29 Plow Route
- Truck 60 - Shared with Rothschild
- Truck 60 Plow Route
- Truck 69 Plow Route
- Village Boundary
- Town Boundary

0 0.25 0.5 1 Miles

N W E S

When to Respond

- Ideal Snow Storm
  - Snow falls between the time most people get home for the day and 4:00 A.M. the next day.
  - No snow during event response.
  - Not on weekends of holidays

- Reality
  - Snow falls anytime of day, week, month, etc.
  - Response has to take place while snow is falling.

- The first goal is to have thoroughfare streets passable by the time people have to drive to work and school ≈ 7:00 A.M.
- The 2nd goal is to have all streets cleared by the time people go home for the day.

Sand and Salt Use During a Snow Event

The Village applies sand and salt on major thoroughfares and on hills, curves and intersections. Depending on the temperature either sand or salt is used. Except for major streets such as Schofield Ave, salt and/or sand is not applied continuously along the entire route in an effort to reduce expenses and reduce chloride infiltration into groundwater and runoff to surface water.

In order for salt to be effective pavement temperatures need to be around 20 degrees or higher. A salt brine is created as traffic drives over the granular salt and the brine is then able to aid in the snow melting process by lowering the freezing temperature of water.

At temperatures below 20 degrees, salt is no longer effective and the Village then applies sand to provide improved traction on snow and ice covered roads.

Cul-de-Sacs

There are over 100 cul-de-sacs in the Village's street system. Current practice is to plow cul-de-sacs with loaders and 1-ton pick-ups to minimize windrows of snow that would otherwise be created with the larger dump trucks. Regardless of how cul-de-sacs are plowed they take a considerable amount of time – between 10 and 15 minutes each – to clear.

This translates to between 1,200 and 1,500 minutes per event, or ≈20 - 25 hours, exclusive of transit time. (This accounts for a 6 to 8 hour shift with the 1-ton trucks and loaders to clear cul-de-sacs). For this reason **cul-de-sacs are not typically cleared during a Level 1 event and are deferred to non-overtime shifts for a Level 2 snow event once snowfall has stopped.**

Another problem to deal with on cul-de-sacs is the limited area to bank snow at the street due to the pie-shaped lots. More frequent snow removal is necessary on cul-de-sacs. Since cul-de-sacs require a disproportionate amount of resources to clear as compared to connected neighborhood streets, the goal is to minimize the additional costs.

Steps the public can take to aid the snow plowing and removal process:

- Stay at least 200 feet behind a snowplow
  - These pieces of equipment frequently stop and backup (especially at intersections)
- Never pass a plow truck on the right side while the truck is clearing roads or spreading ice control
- Do not park your vehicle on the street during a snowfall until the street has been plowed curb to curb (shoulder to shoulder) or if there is a snow emergency
- Do not place garbage/recycling containers in the street or boulevard, these should be placed in the driveway approximately 4 feet from the edge of the street pavement.

RESOURCES AVAILABLE

Snow Plowing Equipment Fleet

- (6) Snowplows w/wings
  - (equipped with sanders/salters)
- (3) Front End Loaders
  - (intersections, cul-de-sacs, wide streets, load salt/sand)
- (1) Road Grader
  - (Hospital Area, Business Park)
- (4) 1 Ton pick-ups
  - (cul-de-sacs, wide intersections, Utility Facilities, Municipal Parking Lots)

Snow Plowing Manpower Pool

- 13 trained single-axle plow drivers
- 12 trained Loader Operators
- 6 trained Grader Operators
- 17 One-ton Pick-up Operators
  - 13 employees for a full Level 3 storm event response.
  - Employees drawn from a pool of 9 “street” employees, 2 “park” employees, 3 “utility” employees, and 2 administrative staff for backup.
  - Overall there are normally 14 total employees to choose from

Typical Assignments During A Level 3 Snow Response Event

Snow Responding Employee	Equipment being Operated
Forrest B (Streets)	**Plow Truck 9**
Randy V (Streets)	**Plow Truck 10**
John Y (Streets)	**Plow Truck 17**
Dick W (Streets)	**Plow Truck 29**
Jessica F (Parks)	**Plow Truck 60**
Jim P (Streets)	**Plow Truck 69**
Doug B (Streets)	**Loader 14**
Jason L (Streets)	**Loader 38**
Tony S (Streets)	**Grader (26)**
Shawn O (Parks)	**Pickup (122)**
Brad M (Parks)	**1-Ton (6)**
Kim K (Streets)	**1-Ton (8)**
Craig G (Utilities)	**1-Ton (31)**
Dave K (Utilities)	**1-Ton (21)**
John B (Utilities)	On Call Utility
Chad D (Utilities)	Back Up Plow Driver
Keith D (Eng)	Back Up 1-Ton
Michael W (Eng)	Back Up 1-Ton

Common Resource Needs for Various Response Levels

RESPONSE TYPE	RESOURCES ASSIGNED
LEVEL 1 – "SALT ROUTES" only Snowfall up to 1"	6 - Single-axle dump trucks with salt/sand spreading capability
LEVEL 2 – All streets except that cul-de-sacs are deferred during emergency/non-scheduled responses. Snowfall between 1" and 3"	6 - Single-axle dump trucks with salt/sand spreading capability 1 – Grader 2 – Loaders
Level 3 – All streets and cul-de-sacs Snowfall of 3" or more. (Cul-de-sacs may be deferred until snowfall has stopped).	6 - Single-axle dump trucks with salt/sand spreading capability 1 – Grader 2 – Loaders 4 – One-ton pick-ups

DETAILS

EQUIPMENT FLEET

6 “Workhorse” Plow Trucks (Single-Axle Dump Trucks)

- These vehicles are equipped with:
  - a front mounted plow and a wing (side) plow,
  - a dump box for holding salt/sand,
  - and a spreader for applying the salt/sand.

  These trucks are responsible for clearing all streets within the Village and Town of Weston. (~292 Lane Miles or just under 50 lane miles per truck)

Snow Plowing Equipment
Single Axle Dump Trucks

Truck #9: 1999 International
Scheduled for Replacement in 2015

Truck #10: 1999 International
Scheduled for Replacement in 2015

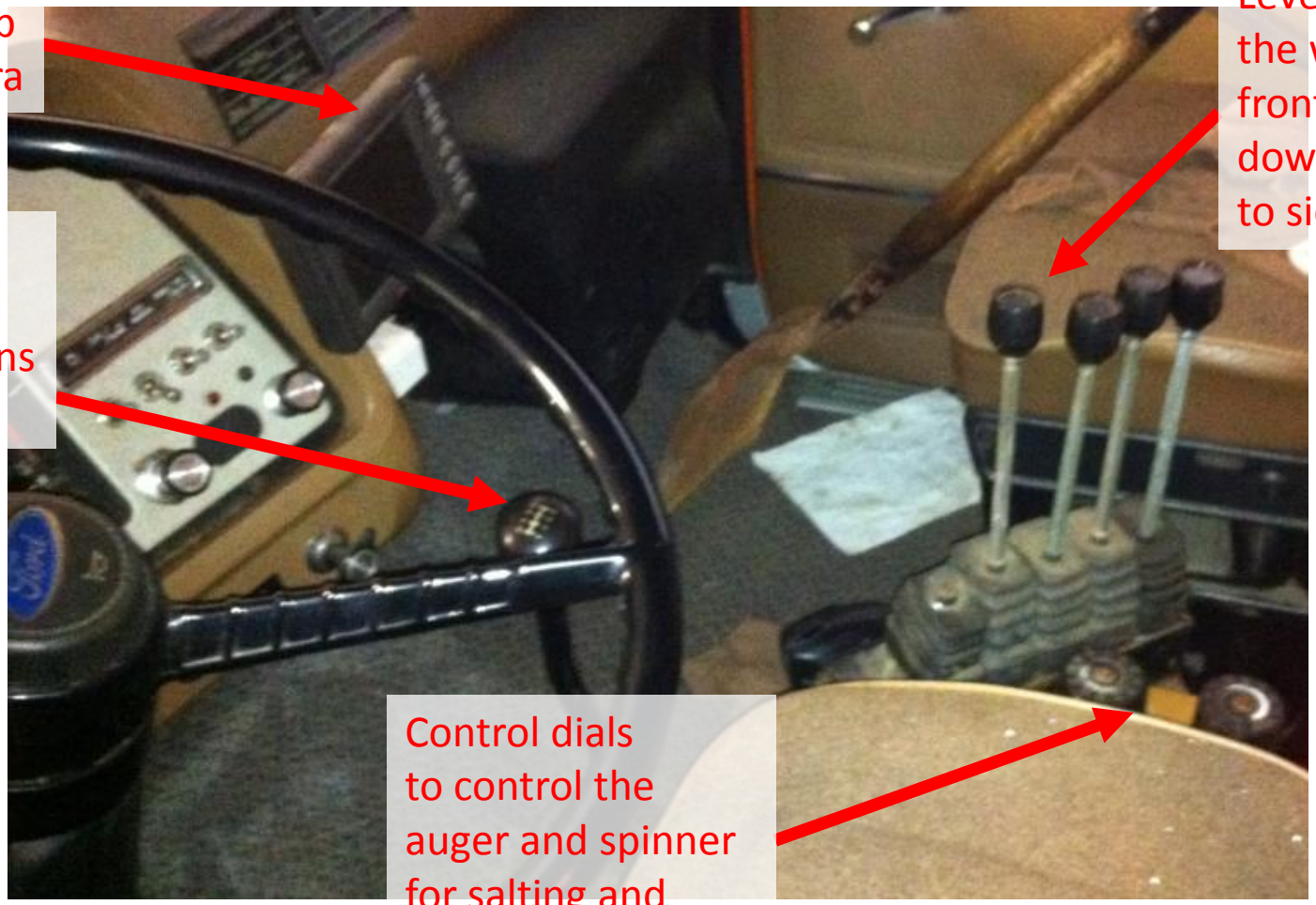
Truck #17: 1993 Ford
Scheduled for Replacement in 2016

Truck #29: 2007 Sterling
Scheduled for Replacement in 2019

Truck #60: 2000 Sterling
Scheduled for Replacement in 2014

Truck #69: 2005 Sterling
Scheduled for Replacement in 2018

The Cab of a Plow Truck



Plow Operator Challenges

The previous slide shows the interior of a single axle dump truck cab. Please consider that a snow plow operator must be constantly vigilant for conflicts along the route that include mailboxes, moving traffic, and parked cars.

At the same time they must be monitoring the rate and location of salt and/or sand application with the interior controls. Frequently this is being done during a snow fall event. There is a combination of physical and mental stress, that any of us who has traveled in a snow storm can appreciate.

Snow Plowing is assisted by additional pieces of equipment to increase productivity and reduce the amount of time to clear the streets.

- A grader, End Loaders, and Pickup/1-Ton trucks are used to aid in snow removal due to the amount of cul-de-sacs and wide intersections. This allows the main plow trucks to make one pass down the street instead of having to back up and maneuver to clear out cul-de-sacs, dead ends, and intersections.

Motor Grader Use for Snow Plowing

- Used around the St. Clare's Hospital area and in the Business and Industrial Park where streets are wider because of the wider blade.
- Graders are best able to get to bare pavement while plowing due to the downward pressure of the blade.

Front End Loaders
Used for Snow Plowing and Removal

- 1989 John Deere
  - Primarily used for loading sand/salt onto Plow Trucks
- 1994 John Deere and 2004 John Deere
  - Used to plow cul-de-sacs, intersections and aid in the removal of snow in the middle of streets to allow plows to make one pass in each direction.
  - Loaders are also used to tow our plow trucks back to the shop in the event there is a breakdown or a truck ends up in the ditch.
  - This equipment is typically assigned to the mechanics due to this more flexible nature of their use in a snow event.

1-Ton and Pick-up Trucks used for Snow Plowing

- <u>1-Tons and Pickups</u>
  - The Village has 4 one-ton routes
  - These trucks are used to plow cul-de-sacs and intersections.
  - This allows the larger equipment to work more efficiently by leaving the more detailed clean up for these smaller trucks.
  - Some of these routes overlap with the loader route that is driven by our mechanic since the mechanic isn't always able to stay on their route due to breakdowns of other vehicles.
  - These trucks also plow out well houses, sanitary lift stations, and Village Parking Lots.

MAILBOXES

Mailbox Policy

Mailboxes are allowed to be placed in street right-of-way as a privilege. They need to be placed so as to minimize, as much as possible, potential interference with the municipality's ability to maintain the street and they are subject to being damaged by vehicles using the right-of-way.

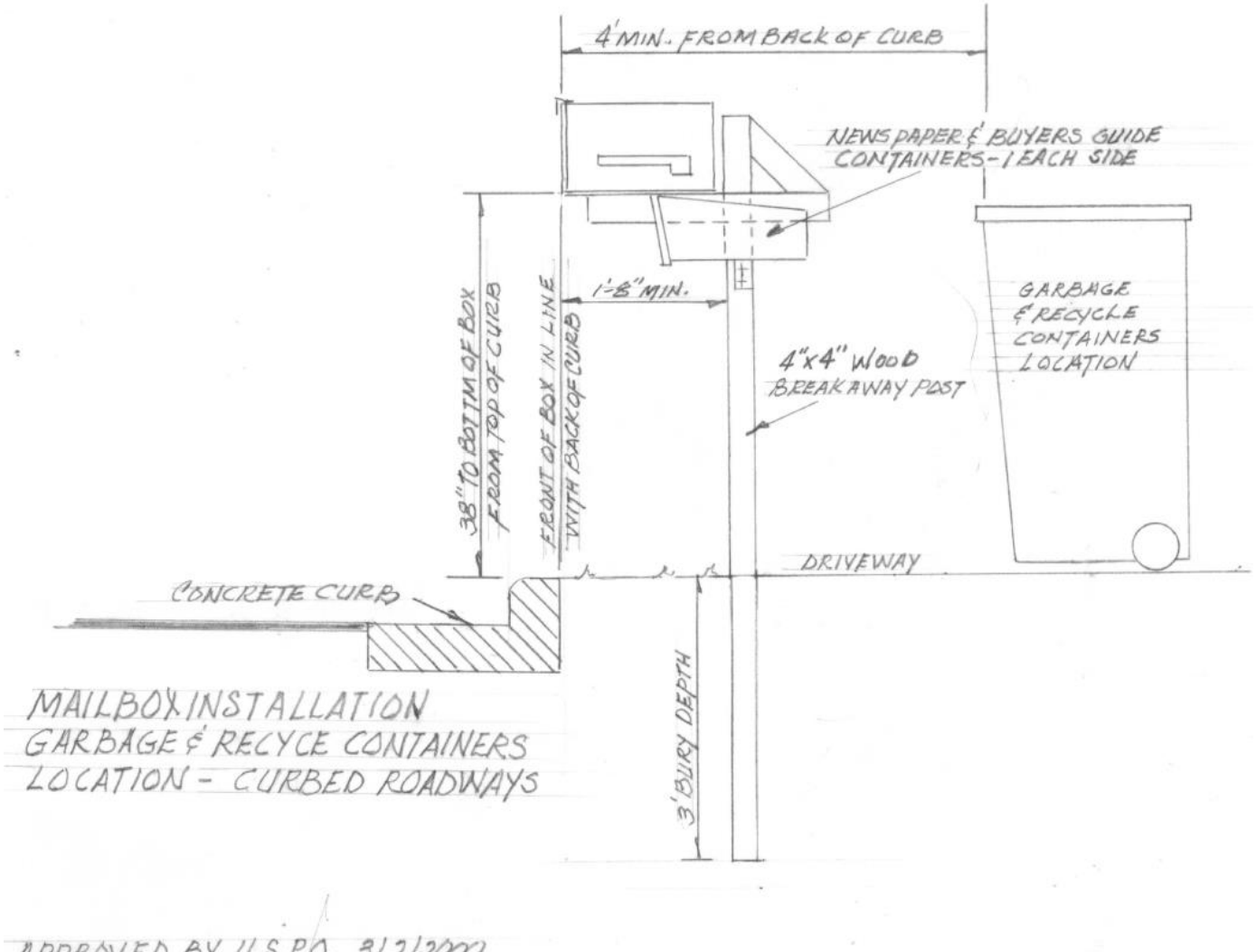
The Village tries to plow as close to mailboxes without hitting them. Mailboxes are typically either hit directly by the plow, by snow/slush coming off of the plow blade, or by snow removal equipment striking frozen snow or ice surrounding the support post.

If a driver knows that a mailbox has been hit, the driver will let staff know by the end of their work shift. If your mailbox has been hit you may call the Village as well to report it. In most cases the Village will provide a temporary mailbox for the property for the remainder of the winter if the current mailbox is no longer functional.

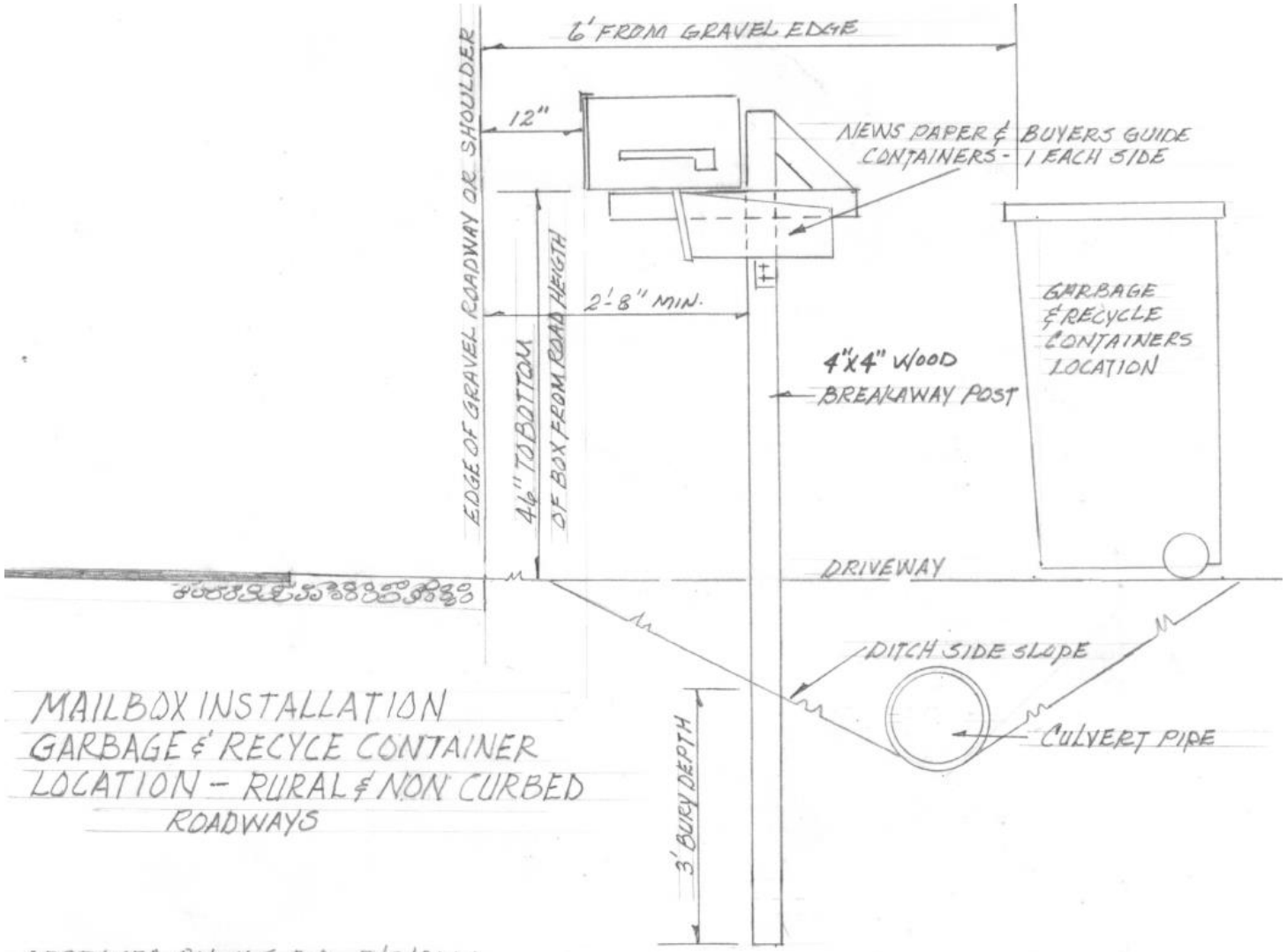
Reports of mailbox damage will be investigated. If the mailbox is found to have been installed correctly and was hit directly by a plow the Village will reimburse the owner up to $25 for a replacement mailbox. The Village recommends the use of a wood 4X4 post with a metal or wood mailbox. Plastic mailboxes become brittle over time and are not able to withstand the force of snow coming off of a plow blade.

Proper mailbox installation guidelines are on the following pages.

Mailbox Installation in a Curb and Gutter Area



Mailbox Installation in a Non Curb and Gutter Area



DETAILS

CLEARING INTERSECTIONS

Plowing Sequence

6 Snow plow routes have been established. These routes are comprised of priority (thoroughfare) streets and secondary (neighborhood) streets. The priority streets are cleared first. These are main thoroughfares such as Schofield Ave, Ross Ave, Alderson St. Jelinek Ave, Weston Ave, etc. On the routing maps you can see this means that snow plow drivers need to drive past the secondary streets in order to clear the primary streets. Thus, extra time is taken to then drive on streets that have already been plowed in order to reach unplowed streets.

In order to allow the single-axle plow trucks to be dedicated to clearing the primary and secondary streets, support snow removal equipment is assigned to take care of cul-de- sacs and widening of intersections. This is more efficient in that it allows the single axle plow trucks to continue traveling forward, minimizing backing maneuvers that would otherwise be needed to clear small areas like intersections and cul-de-sacs. Consider that if the single-axle plow trucks even spent just 3 minutes to plow out the cul-de-sacs, that would translate to 5 hours of additional time spent solely plowing cul-de-sacs. This would then add (on average) an extra hour to plow each of the 6 routes. 1-ton trucks and the front end loaders are assigned to help to clear out large intersections in addition to cul-de- sacs. If this practice were not done the plow trucks would need to back up at every intersection in order to carry all of the snow around the corner and not leave a “pie” of snow in the middle. Sometimes these pies are left, but the pies left are much smaller than what they potentially could be.

“Pie” of Snow left at a typical “T” intersection. A possible hazard is created for drivers driving Westbound if not cleared.

To properly clear the intersection the plow driver would either need to first plow straight through the intersection and then come back and make the right turn to head north, or the driver would make the right turn and then come back to take out the middle at a later time. To eliminate this maneuver for the single axle plow trucks, smaller trucks or loaders are assigned to remove the middle of intersections in order to allow our plow drivers to keep moving in a forward direction.

SNOW REMOVAL

The Purpose of Snow Removal is Three Fold

- Remove snow for better visibility along our streets.
- Removing Snow from Boulevards Provides more storage area for when the next snow storm hits.
- Removing Snow from Boulevards minimizes the amount of snow that is present to melt in the springtime, thus reducing the chances of localized flooding.

Snow Removal Process

- This process includes:
  - 1 Grader
  - 1 Loader with a plow blade
  - 1 Loader with a snow blower attachment
  - At least 4 Dump Trucks
  - Possibly 1 1-Ton Truck to Clean up the street after the Loader with the snow blower

Step 1: Grader Removes Snow that has built up on Banks

Step 2: Loader with Plow Blade Pushes Snow Into a Pile

Step 3: Loader with Snow Blower puts snow into Dump Trucks

SCRAPING STREETS

- Most streets will not have bare pavement through the winter and a layer of snow and ice builds up over multiple snow/ice events.
- Dependent on the number and timing of snow/ice events and weather during and after these events, a thick layer of compacted snow and ice can develop. (This was the case during the winter of 2012/2013).
- Equipment cannot do an effective job of removing the ice/snow if it is bonded to the pavement surface.
- As temperatures warm the pavement bond breaks and it is desirable to scrape the snow/ice layer to promote proper drainage and expose the pavement as the driving surface.
- The most effective equipment for this purpose is the grader, since it is capable of applying downward force to help break the ice/pavement bond.
  - The plows on the single-axle dump trucks cannot apply downward pressure as they simply ride the surface of the snow and ice, unless temperatures have warmed to near or above freezing and a layer of slush has developed.

Equipment Used for Scraping Streets

The Grader is best able to scrape the streets due to the ability to apply downward force as shown above.

An End Loader with a 4 in 1 bucket is capable of scraping streets, however the finished product is not as clean as the grader. Loader with bucket is shown below.

Challenges

- The Village has an aged equipment fleet that is in need of replacement. Funding of replacement equipment is a challenge in the current economic conditions.
- The size of the equipment fleet and snow plow routes have not increased since 1996 even though the number of miles of streets has increased by ~30 centerline miles over that same time. These additional streets are also in most cases wider or are 4-lane roads which are located around the hospital and in the business parks. Due to the extra width a truck needs to make multiple passes in order to clear the entire lane.
  - This is roughly equivalent to an additional snow plow route. One extra single-axle truck could reduce event response time by an hour overall.
- An extended time snow event stretches the Village's resources further and more delay can occur if any equipment breakdowns are experienced.

Contact Us

The Department of Public Works wishes to provide the most effective and responsive snow and ice control possible with the resources it has available. Although we are constantly evaluating our performance, we welcome your input as to the process and our effectiveness from the point of view of our customers/taxpayers.

We welcome your input. However, as stated at the outset, we will not/cannot respond to anonymous contacts. Please contact us at (715) 359-6114 or via the Village Website at http://westonwi.gov